CLAIMS

1. A composition for expression of a DNA coding sequence in a recipient, the composition comprising a polymer microparticle and DNA, wherein the DNA is in aqueous solution, is inside the microparticle and comprises said coding sequence, and wherein the microparticle is 10μm or less in diameter and induces expression of said coding sequence following oral administration to a recipient.

2. A composition according to Claim 1, wherein the polymer is soluble in organic solvent and thereby suitable for formation of microparticles by solvent extraction.

3. A composition according to Claim 1 wherein the DNA is plasmid DNA.

4. A composition according to Claim 1 wherein the DNA comprises a sequence promoting transcription of the coding sequence.

5. A composition according to Claim 1 is non-toxic and pharmaceutically acceptable and wherein the microparticle consists of or comprises a bio-degradable polymer.

6. A composition according to Claim 5 wherein the polymer is selected from the group consisting of a lactide containing polymer, a glycolide-containing polymer, and a polymer comprising lactide and glycolide.

7. A composition according to Claim 1 wherein the microparticle is greater than 0.1 μm in diameter.

8. A composition according to Claim 1 wherein the DNA codes for an immunogen.

9. A composition according to Claim 8 wherein the DNA codes for a innumogenic component of a pathogenic organism selected from the group consisting of pathogenic bacteria and pathogenic viruses.

10. A pharmaceutical composition comprising a plurality of polymer microparticles and a pharmaceutically acceptable carrier, wherein the microparticles contain an aqueous solution of DNA that comprises a sequence coding for a polypeptide, wherein the microparticle is adapted to induce expression of the polypeptide following administration to a recipient, and wherein the polypeptide is selected from:-

(a) the antigens FHA, PT, 68kd-Pertactin, tetanus toxin, gp48, NS1, Capsid, gp350, NS3, SA, I, NP E, M, gp340, F, H, HN, 35kd protein, BP1, E1, E2, C, M, E and MSHA according to table 1; and

(b) immunogenic fragments, variants and derivatives of the polypeptides of (a).

11. A composition according to Claim 10 comprising microparticles of 10 μm or less in diameter.

12. A composition according to Claim 11 comprising double-stranded DNA selected from (i) plasmid DNA and (ii) DNA derived from plasmid DNA by one or more of insertion, deletion and substitution.

13. A composition according to Claim 12 wherein the DNA comprises a sequence promoting transcription of the coding sequence.

14. A composition according to Claim 10 wherein the microparticle is non-toxic and pharmaceutically acceptable and consists of or comprises a bio-degradable polymer.

15. A composition according to Claim 14 wherein the polymer is a lactide

containing polymer.

16. A composition according to Claim 14 wherein the polymer is a glycolide-containing polymer.

17. A composition according to Claim 14 wherein the polymer comprises poly (DL-lactide-co-glycolide).

18. A composition according to Claim 10 wherein at least 50% of the microparticles are in the size range 0.1 μm to 10 μm.

19. A vaccine for eliciting antibodies against an immunogen, comprising a composition according to Claim 10 and a pharmaceutically acceptable carrier, wherein the DNA sequence codes for said immunogen.

20. A vaccine according to Claim 19 further comprising a taste-enhancing agent.

21. A vaccine according to Claim 19, comprising first and second vaccine components, the first vaccine component comprising DNA inside a microparticle wherein the DNA includes a sequence coding for an immunogen and wherein the microparticle has a first half-life *in vivo*, and a second vaccine component comprising DNA inside a microparticle, wherein the DNA contains a sequence coding for an immunogen and wherein the microparticle has a second half-life *in vivo*.

22. A vaccine according to Claim 21 wherein the immunogen of the first vaccine component and the immunogen of the second vaccine component are the same.

23. A vaccine according to Claim 21 wherein the first and second half-lives are, respectively, up to 2 weeks and more than 2 weeks.

24. A composition comprising polymer-encapsulated DNA and having a water content of less than 5%, obtained by freeze-drying a composition according to Claim 1.

25. A method of encapsulating an aqueous solution of DNA in a polymer microparticle, comprising

- providing a (water-in-oil)-in-water emulsion containing the DNA solution; and

- adding this emulsion to excess of a further aqueous phase to extract the oil phase and thereby form microparticles,

wherein the further aqueous phase is at elevated temperature.

26. A method according to Claim 25 wherein extraction of the oil phase is carried out using a further aqueous phase at a temperature of 25°C or above.

27. A method according to Claim 26 wherein extraction of the oil phase is carried out using a further aqueous phase at a temperature of 30°C or above.

28. A method according to Claim 25 comprising preparing an aqueous solution of DNA and alcohol with an alcohol content of 1 to 40%.

29. A method according to Claim 25 comprising forming microparticles in the size range 0.01 μm to 30 μm.

30. A method according to Claim 25 wherein the DNA is circular, plasmid DNA, or circular plasmid-derived DNA.

31. A method according to Claim 25 wherein the further aqueous phase is at

least 5°C higher in temperature than the (water-in-oil)-in-water emulsion.